

Street grade
Manhole frame and cover Alhambra Fdy. A-1495 or equal approved by City.

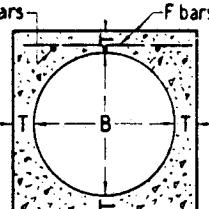
Concrete rings and reducer see Standard Dwg. No. 451.

Minimum 2'-10 1/2" with paved streets
" 3'-6" " unpaved "
(See Note 5)

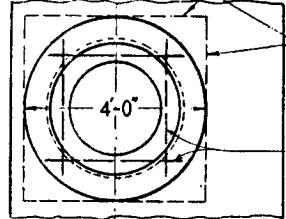
2" round galvanized steel steps
1'-5" O.C.

36" R.C.P.

5x 2" pipe seat
C and D bars
Tie bars

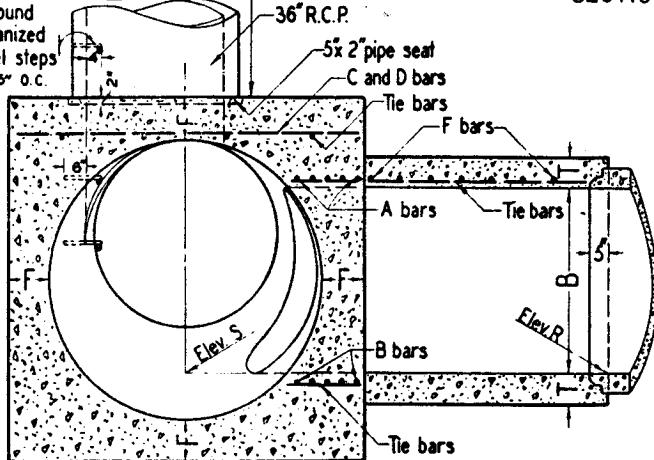


SECTION GG



PLAN
(Rings and cover not shown)

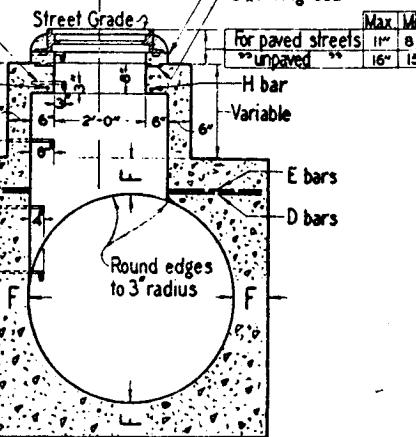
Optional outside face of concrete
No. 4 H bars
3'-0" long



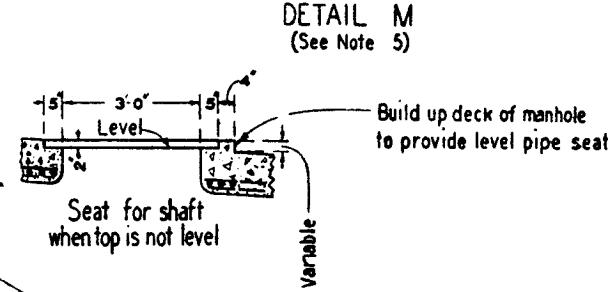
SECTION N-M-P-O
Projected on P-P-O

Omit this step
in paved streets

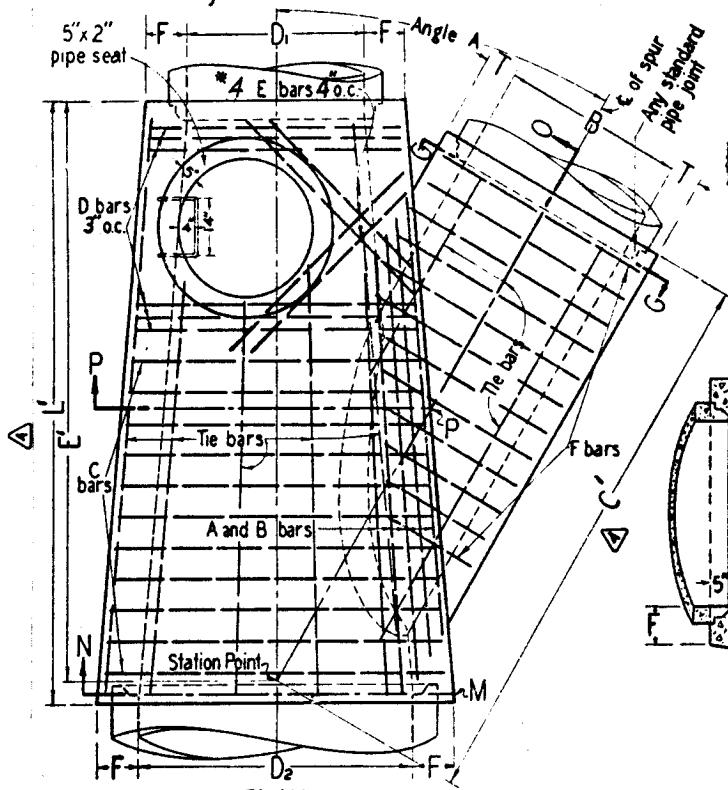
H bar
16" for paved streets
26" for unpaved streets



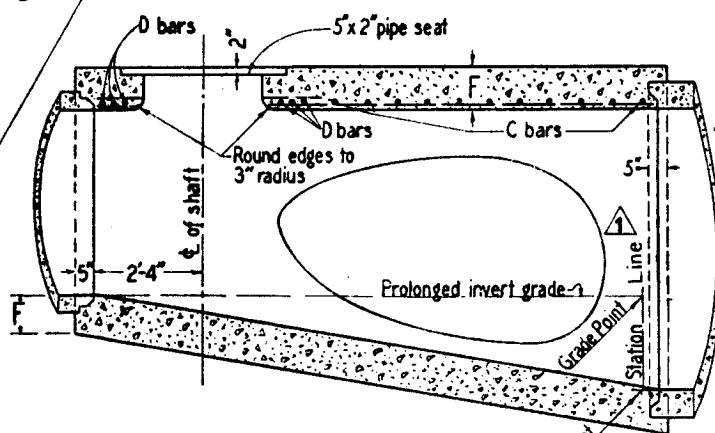
Max. Min.
for paved streets 11" 8 1/2"
" unpaved " 16" 15"



DETAIL M
(See Note 5)



PLAN
(Shaft not shown)



LONGITUDINAL SECTION

Grade Point
see Hole 10

APPROVED *Robert C. Miller* DATE *7/12/82*
PUBLIC WORKS DIRECTOR - R.C.E. 18793

CITY OF RIVERSIDE
PUBLIC WORKS DEPT. - ENGINEERING DIV.

1	Note Revision	July 8-25-80
2	Defined Approval	R.C.R. 4-7-82
3	Changed Riverside Fdy to Alhambra	July 7-7-82
4	Added: Prime to C, E, & L, and Sheet 3.	7/12/82
MARKE	REVISIONS	APPR. DATE

STANDARD DRAWING NO.

432
Sheet 1 of 3

NOTES

- 1 - VALUES for A,B,C,D,₁,D,₂,E,₁'L,Elevation R, and Elevation S are shown on the improvement plan (see Sheet 3 of 3).
 TABLE of values for F and T hereon.
- 2 - LATERALS: If laterals enter on both sides of manhole, access shaft shall be located on side receiving the smaller lateral
 Laterals shall be designated on improvement plan as right or left, facing in the direction of stationing.
- 3 - CENTER OF MANHOLE SHAFT shall be located over center line of main storm drain when D₁ is 48" or less, in which
 case place 4 E bars symmetrically around shaft at 45° with center line.
- 4 - LENGTH L (shown on improvement plan) may be increased at option of Contractor to meet pipe ends, but any change
 in location of spur must be approved by the City Engineer.
- 5 - DETAIL M : When depth of manhole from street grade to top of box is less than 2'-10½" for paved streets or 3'-6"
 for unpaved streets, construct monolithic shaft as per Detail M
 The Contractor shall have the option of constructing shaft as per Detail M for any depth of manhole.
 When diameter D₁ is 48" or less, center of shaft shall be located as per Note 3.
- 6 - REINFORCING STEEL shall be round, deformed, straight bars, ½" clear from face of concrete unless shown otherwise.
 Tie bars shall be No.3 and spaced 18" on centers or closer.
 Steel schedule detailed on improvement plan
- 7 - CONCRETE shall be in accordance with the table of Concrete Specifications.
- 8 - STEPS shall be 3" round, galvanized steel and anchored not less than 6 inches in the walls of structure. Unless
 otherwise shown the spacing shall be 1'-5" on centers. The lowest step shall be not more than 2 feet
 above the invert. (Alhambra Fdy. A-3320, or Equal Approved by City.) ① ②
- 9 - RINGS, REDUCER, AND PIPE for access shaft shall be seated in cement mortar and neatly pointed or
 wiped inside shaft.
- 10- STATIONS of manholes shown on improvement plan apply at intersection of center lines of main line and
 spur. Elevations shown at stations refer to prolonged invert grade lines.
- 11- FLOOR of manhole shall be steel troweled to springing line
- 12- BODY of manhole, including spur, shall be poured in one continuous operation, except that the Contractor shall have the
 option of placing at the springing line a construction joint with longitudinal keyway.
- 13- ELEVATION "S" applies at center of main line on prolongation of invert of spur

TABLE OF BAR SIZES		
D ₂ or B	A & B bars	D or F bars
.12"-39"	No.5 at 3"	No.4 at 6"
42"-84"	No.6 at 3"	No.5 at 6"
90"-144"	No.7 at 3"	No.6 at 6"

③

TABLE OF VALUES FOR F AND T

D ₂	F	B	T
12"	4"	12"	4"
15"	4½"	15"	4½"
18"	4¾"	18"	4¾"
21"	5"	21"	5"
24"	5¼"	24"	5¼"
27"	5½"	27"	5½"
30"	6"	30"	6"
33"	6¼"	33"	6¼"
36"	6½"	36"	6½"
39"	7"	39"	7"
42"	7½"	42"	7½"
45"	7¾"	45"	7¾"
48"	8"	48"	8"
51"	8½"	51"	8½"
54"	9"	54"	9"
57"	9¼"	57"	9¼"
60"	9½"	60"	9½"
63"	10"	63"	10"
66"	10½"	66"	10½"
69"	10¾"	69"	10¾"
72"	11"	72"	11"
75"	11½"		
84"	12½"		
90"	13½"		
96"	14"		

CONCRETE SPECIFICATIONS	
F	CONCRETE CLASS
4"- 7"	560 - C - 3250
7½"- 9½"	560 - C - 3250
10"- 14"	560 - B - 3250

14 - COVER shall have letter D in center.

(ADAPTED FROM CITY OF LOS ANGELES STD. PLAN NO. B - 1528)

APPROVED	<i>Robert J. Miller</i>	DATE	7/14/78
PUBLIC WORKS DIRECTOR - R.C.E. 18793			
①	defined approval	DZR	4-7-82
②	Changed Riverside Fdy to Alhambra		7-7-82
③	Added Table Of Bar Sizes		11-9-82
④	Added Sheet 3.		7/14/78
MARK	REVISIONS	APPR.	DATE

CITY OF RIVERSIDE
 PUBLIC WORKS DEPT. - ENGINEERING DIV.

MANHOLE JM

STANDARD DRAWING NO. 432

Sheet 2 of 3

STORM DRAIN MAIN							
D/D2	ANGLE	30	40	50	60	70	80
12	C	2.2	1.8	1.6	1.5	1.4	1.3
	E	1.9	1.5	1.2	1.0	0.8	0.6
15	C	2.5	2.0	1.8	1.6	1.5	1.5
	E	2.2	1.7	1.3	1.1	0.9	0.7
18	C	2.8	2.3	2.0	1.8	1.7	1.6
	E	2.4	1.8	1.4	1.1	0.9	0.7
21	C	3.1	2.5	2.2	2.0	1.9	1.8
	E	2.7	2.0	1.6	1.2	1.0	0.7
24	C	3.4	2.7	2.4	2.2	2.0	2.0
	E	3.0	2.2	1.7	1.3	1.0	0.8
27	C	3.7	3.0	2.6	2.3	2.2	2.1
	E	3.2	2.4	1.8	1.4	1.1	0.8
30	C	4.0	3.2	2.8	2.5	2.4	2.3
	E	3.5	2.6	2.0	1.5	1.1	0.8
33	C	6.3	3.6	3.0	2.7	2.5	2.4
	E	3.8	2.8	2.1	1.6	1.2	0.8
36	C	4.6	3.7	3.2	2.9	2.7	2.6
	E	4.0	2.9	2.2	1.7	1.2	0.9
39	C	4.9	3.9	3.4	3.0	2.9	2.7
	E	4.3	3.1	2.4	1.8	1.3	0.9
42	C	5.3	4.2	3.6	3.2	3.0	2.9
	E	4.6	3.3	2.5	1.9	1.4	0.9
45	C	5.5	4.4	3.8	3.4	3.2	3.1
	E	4.9	3.5	2.6	2.0	1.4	0.9
48	C	5.8	4.6	4.0	3.6	3.3	3.2
	E	5.1	3.7	2.7	2.0	1.5	1.0
51	C	6.2	4.9	4.2	3.8	3.5	3.4
	E	5.6	3.9	2.9	2.1	1.5	1.0
54	C	6.5	5.2	4.4	4.0	3.7	3.5
	E	5.7	4.1	3.0	2.2	1.6	1.0
57	C	6.8	5.6	4.6	4.1	3.8	3.7
	E	5.9	4.2	3.1	2.3	1.6	1.1
60	C	7.1	5.6	4.8	4.3	4.0	3.8
	E	6.2	4.4	3.3	2.4	1.7	1.1
63	C	7.4	5.9	5.0	4.5	4.2	4.0
	E	6.5	4.6	3.4	2.5	1.8	1.1
66	C	7.7	6.1	5.2	4.7	4.3	4.2
	E	6.7	4.8	3.5	2.6	1.8	1.1
69	C	8.0	6.4	5.4	4.9	4.5	4.3
	E	7.0	5.0	3.7	2.7	1.9	1.2
72	C	8.3	6.6	5.6	5.0	4.7	4.5
	E	7.3	5.2	3.8	2.8	1.9	1.2
75	C	8.6	6.8	5.8	5.2	4.8	4.6
	E	7.5	5.3	3.9	2.8	2.0	1.2
78	C	9.0	7.1	6.0	5.4	5.0	4.8
	E	7.8	5.5	4.0	2.9	2.0	1.2
81	C	9.3	7.3	6.2	5.6	5.2	4.9
	E	8.1	5.7	-6.2	3.0	2.1	1.3
84	C	9.6	7.6	6.6	5.7	5.3	5.1
	E	8.4	5.9	4.3	3.1	2.2	1.3
87	C	9.9	7.8	6.6	5.9	5.5	5.3
	E	8.6	6.1	4.6	3.2	2.2	1.3
90	C	10.2	8.1	6.8	6.1	5.7	5.4
	E	8.9	6.3	4.6	3.3	2.3	1.6
93	C	10.5	8.3	7.0	6.3	5.8	5.6
	E	9.2	6.5	4.7	3.6	2.3	1.4
96	C	10.8	8.5	7.2	6.5	6.0	5.7
	E	9.6	6.7	4.8	3.5	2.4	1.6

STORM DRAIN LATERAL							
B	ANGLE	30	40	50	60	70	80
12	C	1.9	1.5	1.2	1.0	0.8	0.6
	E	2.2	1.8	1.4	1.1	0.9	0.7
15	C	2.2	1.7	1.3	1.1	0.9	0.7
	E	2.5	2.0	1.8	1.6	1.4	1.2
18	C	2.4	1.8	1.4	1.1	0.9	0.7
	E	2.8	2.3	2.0	1.8	1.7	1.6
21	C	2.7	2.0	1.6	1.2	1.0	0.8
	E	3.1	2.5	2.2	2.0	1.9	1.8
24	C	3.0	2.2	1.7	1.3	1.0	0.8
	E	3.4	2.7	2.4	2.2	2.0	2.0
27	C	3.2	2.4	2.0	1.8	1.6	1.4
	E	3.7	3.0	2.6	2.3	2.2	2.1
30	C	3.5	2.6	2.0	1.5	1.1	0.8
	E	4.0	3.2	2.8	2.5	2.4	2.3
33	C	3.8	2.8	2.1	1.6	1.2	0.8
	E	4.3	3.4	3.0	2.7	2.5	2.4
36	C	4.0	2.9	2.2	1.7	1.2	0.9
	E	4.6	3.7	3.2	2.9	2.7	2.6
39	C	4.3	3.1	2.4	1.8	1.3	0.9
	E	4.9	3.9	3.4	3.0	2.9	2.7
42	C	4.6	3.3	2.5	1.9	1.4	0.9
	E	5.3	4.2	3.6	3.2	3.0	2.9
45	C	4.9	4.4	3.8	3.4	3.2	3.1
	E	5.5	4.4	3.6	3.8	3.2	3.1
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	E	5.8	4.6	4.0	3.6	3.3	3.2
51	C	5.4	3.9	4.2	3.5	3.1	3.0
	E	6.2	4.9	4.2	3.8	3.5	3.4
54	C	5.7	4.1	3.0	2.2	1.6	1.0
	E	6.5	5.2	4.4	4.0	3.7	3.5
57	C	5.9	4.2	3.1	2.3	1.6	1.1
	E	6.8	5.4	4.6	4.1	3.8	3.7
60	C	6.2	4.4	3.3	2.4	1.7	1.1
	E	7.1	5.6	4.8	4.3	4.0	3.8
63	C	6.5	4.6	3.4	2.5	1.8	1.1
	E	7.4	5.9	5.0	4.5	4.2	4.0
66	C	6.7	4.8	3.5	2.6	1.8	1.1
	E	7.7	6.1	5.2	4.7	4.3	4.2
69	C	7.0	5.0	3.7	2.7	1.9	1.2
	E	8.0	6.4	5.4	4.9	4.5	4.3
72	C	7.3	5.2	3.8	2.8	1.9	1.2
	E	8.3	6.6	5.6	5.0	4.7	4.5
75	C	7.5	5.3	3.9	2.8	2.0	1.2
	E	8.6	6.8	5.8	5.2	4.8	4.6
78	C	7.8	5.5	4.0	2.9	2.0	1.2
	E	9.0	7.1	6.0	5.4	5.0	4.8
81	C	8.1	5.7	-6.2	3.0	2.1	1.3
	E	9.3	7.3	6.2	5.6	5.2	4.9
84	C	8.4	5.9	4.3	3.1	2.2	1.3
	E	9.6	7.6	6.4	5.7	5.3	5.1
87	C	8.6	6.1	4.6	3.2	2.2	1.3
	E	9.9	7.8	6.6	6.6	5.9	5.5

- EXAMPLE:
Given:
D₂ = 60"
B = 39°
A = 50°
Find: C', E', & L'
- SOLUTION:
1. Enter Storm Drain Main Table with Given D₂ & A.
C_M = 4.8 ft. E_M = 3.3 ft.
2. Enter Storm Drain Lateral Table with Given B & A.
C_L = 2.4 ft. E_L = 3.4 ft.
3. C' = C_M + C_L = 4.8 ft. + 2.4 ft. = 7.2 ft.
4. E' = E_M + E_L = 3.3 ft. + 3.4 ft. = 6.7 ft.
5. L' = E' + 1 ft. = 6.7 ft. + 1 ft. = 7.7 ft.

APPROVED: *[Signature]* DATE: *12/23/84*
PUBLIC WORKS DIRECTOR - R.C.E. 18793

CITY OF RIVERSIDE
PUBLIC WORKS DEPT. - ENGINEERING DIV.

MANHOLE : JM

STANDARD DRAWING NO. **432**

Sheet 1 of 3

MARK REVISIONS APPR. DATE